



# ACAA Initial Entry – Brookfield Multiplex Melbourne Convention Centre Project

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## Outcomes achieved against planned targets for key project parameters

### World's First and Only 6 Star Green Star Convention Centre

The Melbourne Convention Centre (MCC) sets a global standard with its innovative environmental design features. Brookfield Multiplex (BM) exceeded the contract obligations for a four-star Green Star rating to deliver a six-star rating.

MCC's Green Star rating points were awarded for:

- Black Water Treatment Plant (BWTP) that recycles waste water to supply toilets, cooling towers and irrigate landscapes
- solar heating for 40% of hot water (100% hand basins)
- water efficient fittings including waterless urinals
- roof water collection for BWTP top up, cooling towers and irrigation
- construction materials sourced from sustainable sources
- low VOC paints and adhesives, FSC-Certified Timber, minimal use of PVC, zero ODP insulations

- on site waste recycling during construction
- automatic daylight control of lux levels in foyer/prefunction spaces
- passive initiatives such as glass coatings to reduce heat ingress, a design that utilises the maximum amount of daylight, chilled beams and displacement ventilation, radiant in-floor heating and cooling, high fresh air rates for indoor air quality and CO<sub>2</sub> monitoring

The project also won a Banksia Award (2009) in the Built Environment category.

### **96% of site generated waste recycled, exceeding target of 80%**

A comprehensive recycling program reduced waste going to landfill; and rebates received for recycled materials significantly offset the cost of waste management. A trade waste agreement with South East Water incorporated a triple interceptor to filter any site water before entering the Yarra.

### **Completed on time**

The project design was significantly underdeveloped at commencement of construction, therefore fast track D&C delivery of this complex 70,000m<sup>2</sup> building in 34 months is a significant achievement.

BM maximised the number of work fronts to enable excavation works to finish six weeks ahead of program.

### **Completed within Budget**

The \$450M project was delivered within the planned budget. Through a strong working relationship BM and the Client were able to keep the number of Client Initiated Change Notices to a minimum and these were agreed during the construction period.

### **Innovative Safety Initiatives**

A proactive safety culture was established from the top down. Our comprehensive program of safety training and education ensured BM staff and subcontractors understood the importance of safety and made it paramount.

Although not a legal obligation, BM undertook a risk assessment of the building for the end-user in accordance with Section 28 OH&S Act 2004. This ensured risks associated with the design were identified and eliminated to provide MCC operatives with the safest possible workplace.

Innovative safe construction initiatives implemented on this project earned BM a final placing in the 2008 Work Safe Awards.

### **Recognised High Quality Achieved**

The high quality of the building was achieved through engagement of highly skilled subcontractors and the management of an extensive approvals regime. An intensive schedule of comprehensive technical tests, inspections and re-inspections was carried out by all stakeholders, including an Independent Reviewer, to ensure expectations of all parties for highest quality was met. This process was lengthy,

taking place over a four-month period. Less than 1% of defects remained to be resolved at the project's conclusion.

### **Satisfied Stakeholders**

Stakeholder's high expectations were met and in some instances surpassed primarily because of BM's rigorous and iterative consultative process and our strong drive to achieve the best outcomes for the project. The intensive inspection and testing regime ensured delivery of the building and products met the level required by all parties.

### **Complexity, difficulty and optimisation of the construction task**

The MCC was complex to construct due to its size (70,000m<sup>2</sup>), non-rectilinear forms, high architectural style, extreme volumes of the main foyer and plenary hall, the divisibility and flexibility of the plenary hall, the advanced AV technology and the extent of food and beverage preparation areas and food service equipment.

The difficulty of the construction task was a function of the complexity of the building, and site and time constraints. Some of the many difficult construction tasks resulted in innovative logistical solutions including:

- creation of a Bentonite 'cut off' wall around the building zone to stop river and groundwater from invading the site — the retractable seating and stage pits are up to 5.3m below the water level
- optimised use of Ortech and Speed panel systems to close up the plenary hall to allow critical works above and below to be undertaken concurrently and safely, taking weeks off the program. The entire Ortech ceiling was covered in plywood to maintain its structural integrity when exposed to the weather (before the roof was placed), to provide a trafficable surface during construction, and to provide easier future maintenance
- 16.35m-high, twin operable walls installed in a sandwich configuration to achieve the required acoustic rating of Dw60
- dismantling of a Heritage-listed wharf shed for storage and retention of the dry dock pump and housing associated with the maritime museum. These were housed inside a glazed box to protect it from the elements and visually attach the structure to the architecture of the plenary hall building

Other difficult construction tasks included:

- installation of 1,220 piles, some extending down 37m through Coode Island silt to Basalt
- cement stabilization to provide an accessible road for fire trucks along the Yarra River's dry dock edge

- manufacture and installation of super trusses spanning the plenary hall to support the roof, stage technical grid and operable walls
- installation of the plenary hall 1,585-seat automated retractable seating system for rapid mode configuration change — the largest and most complex installation of this type of system undertaken
- FSC-certified timber veneer faceted ceiling and wall finishes in the plenary hall
- installation of 80m roof sheets in single lengths
- development of safe formwork systems for 22m-high plenary hall columns, completed in two pours.
- development of a manual and installation of crane control software explaining and controlling the logistical risks of operating six hammerhead cranes on site.

Site access to the plenary hall building was constrained on all sides by the existing Melbourne Exhibition Centre (MEC), the Westgate Freeway, the separate South Wharf Project and the Yarra River, as well as the hotel built atop the plenary hall building podium.

Initiatives to minimise the impact of these constraints on the project and schedule included:

- construction of a suspended walkway to the MEC maintaining pedestrian access from the car park
- placement of concrete boom, pumps and lines in the South Wharf retail project to pour the plenary hall basement kitchen floor
- shared usage of a crane for hotel and plenary hall façade elements
- coordination of works above and below on three projects concurrently ensuring the safety of all workers

## **Leadership and management of the project delivery**

BM created a strong team of leadership, retaining key staff throughout all phases of the project whilst maintaining flexibility to adapt roles to address changing requirements of the project. Team members established strong relationships, allowing difficult issues to be addressed without delay. Open lines of communication ensured direct liaison and effective working relationships between organisations.

BM took on the full responsibility for the design of this project. A fast-paced program was developed to advance the design through development, approvals and construction documentation. Procedures were constantly assessed to ensure value management prior to tendering and letting of packages to retain efficiency of design and construction methodologies whilst keeping to the Architect's design intent, Client Brief and Green Star rating requirements.

New technology was used, wherever possible, to review electronically for faster turnaround of approvals.

The Site Management team responsible for construction operations drove a fast-paced program of works carefully managed, with a strong focus on opening up areas to keep trades moving through the building whilst maintaining a safe workplace. The site construction operations peaked with a turnover of \$25M in a month and man count of 1,000 workers. A double shift was utilised towards the end of the project to ensure completion on time.

The MCC had an outstanding IR performance, with considerable support from all unions on the project and enabling considerable workplace flexibility and high levels of productivity, even when working many non-typical hours. There was no lost time due to site industrial action and no lost time during the recognition of Enterprise Agreements.

The project implemented significant development opportunities for young professionals. We employed 25 graduates and 7 cadets on the project as part of our Graduate Development Program; 25% of these were women — well above industry average.

In addition to routine safety training, several construction workers undertook Certificate IV and Diploma courses in OH&S.

BM maximized the use of local suppliers, identifying those that could help achieve the six-star rating, creating significant wins for local industry including:

- conversion of the Canadian 'Gala Systems' product to a locally designed and manufactured installation and
- development of a locally produced Forest Stewardship Council (FSC) certified timber veneer board previously not available in Australia

For these achievements, BM won the ICN 2007 Industry Achievement Awards – VIPP Category.



Main Foyer



Plenary Hall